UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Escola Tècnica Superior d'Enginyeria
de Telecomunicació de Barcelona

IT Risk Advisory

A Master's Thesis

Submitted to the Faculty of the

Escola Tècnica d'Enginyeria de Telecomunicació de Barcelona

Universitat Politècnica de Catalunya

by

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In partial fulfilment

of the requirements for the degree of

MASTER IN TELECOMMUNICATIONS ENGINEERING

Advisor: Anna Umbert Juliana

Barcelona, January 2018

Title of the thesis: **IT Risk Advisory**

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Abstract

The current business environment presents many risks for the companies, so it is truly desirable that its administration occupies an overriding place in the companies' agenda. The business evolves -and so it does the risks- and at the same time, they try to adapt to the necessities of the customers and the changes in the economy. The capacity of the administrators to anticipate the threads, answer back and to attune continuously depends now, more than ever, on their strengths of administrating the risks.

To fulfil the needs of the different company's types an IT risk department that tries to understand and manage all the IT risk requirements is created. IT risk management is the application of risk management methods to information technology to manage the IT risk. These departments aim to manage the risks that come with the ownership, involvement, operation, influence, adoption and use of IT as part of a larger enterprise. This encompasses not only the risks and negative effects of service and operations that can degrade organizational value, but it also takes the potential benefits of risky ventures into account.

As a rule, risk is defined as the product of the likelihood of occurrence. In IT, however, risk is defined as the product of the asset value, the system's vulnerability to that risk and the threat it poses for the organization. In a few words, the risks are managed according to an assessment, mitigation and evaluation.

This project will be focused on the explanation of the basics, the procedure, the difficulties and the solutions of real cases of auditory and consultancy that is important parts of any IT risk department.

Acknowledgements

I would like to thank to my supervisors in both fields: University and Deloitte.

To my university's supervisor for guiding me in the entire project and to my Deloitte's supervisors for teaching me the necessary knowledge to carry out the project.

Revision history and approval record

Revision	Date	Purpose
0	28/12/2017	Document creation
1	20/02/2018	Document revision
2	13/03/2018	Document revision

Written by:		Reviewed and approved by:	
Date	13/03/2018	Date	13/03/2018
Name	Daniel López Fornieles	Name	Anna Umbert Juliana
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1. Introduction

The importance of managing the IT risk in the enterprises supposes a capital benefit for them. Each enterprise has its own risks and it must be taken as individual because the risks not only depend on the type (legal, cyber security, auditory…) but on the way the company works.

Every company has its own way to work and to manage its software. This project is focused in a company that works with SAP[1] software. This system is the collective term for SAP's functional and technical modules that enable enterprises to manage business processes through a unified system. Both SAP consultancy and SAP auditory were required by the company to enhance its processes and to fulfil the legal requirements respectively. In other words, the auditory and the consultancy are almost essential in every enterprise that wants to improve.

In this project, we will expose the basic information to understand the SAP licensing model. The purpose is to be able to perform a SAP's auditory and consultancy in any enterprise. Basically, we needed to investigate and create a new method in which we could find all the information we needed in a SAP's system. Notice that this is the first kind of project in the citied company, so it has a component of innovation thought always keeping in mind that we have followed the structures and the to-do-way of the company.

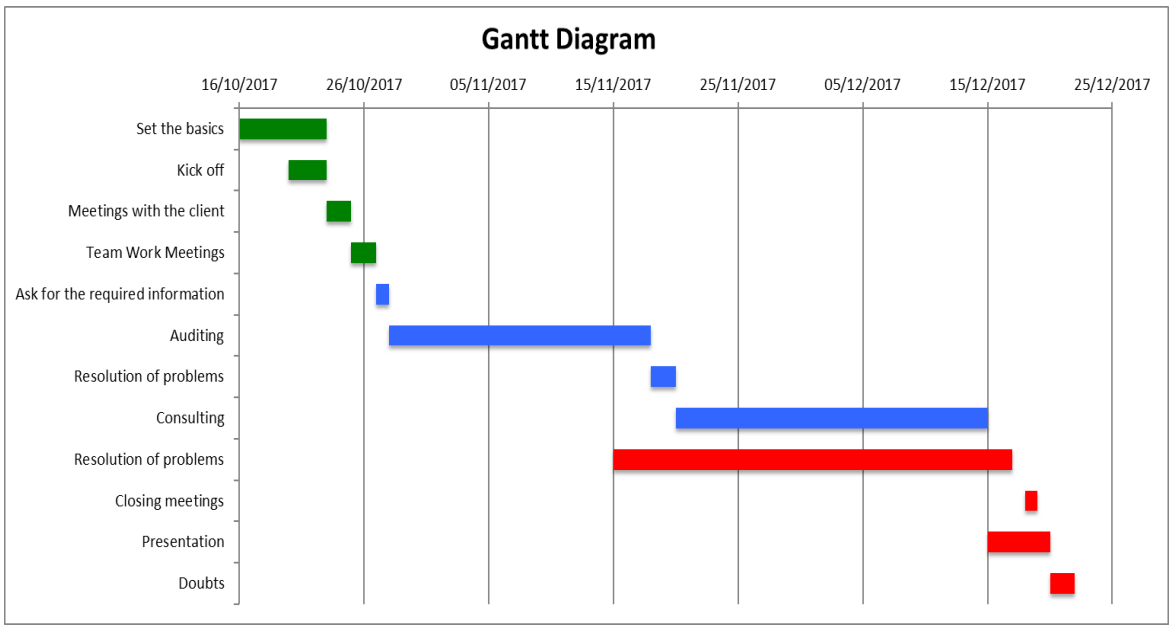
Three people did the project: a manger, a senior and an assistant (me). Depending on the needs of the project, someone may help us but only for a while. Besides, the people that worked in the audited and consulted company gave us a hand in order to coordinate and cooperate in the project. The senior and I were the ones that went to the client, developed the auditory and the consultancy and worked hand to hand with the different departments. The manager was the supervisor of the project and watched the timings of it.

This report will be based in two different parts: The first one will include the theoretical part of the project that explains the need of performing any kind of IT risk advisory project on a company, starting from the basics to the particular cases in different kinds of enterprises in different sectors. The second part, the practical one, will include some practical examples to put into practise the topics explained before. This section will explain the problematics, the solutions and the goals of any auditory and consultancy of the SAP software. Moreover, it will include real cases performed by the team to create a global vision and the understanding of what is explained, exported to the reality. It will include the approach and the point of view of an engineer to have a project seen for every angle. Being this way, it is highlighted not only the theoretical and the practical part but also the vision and the understanding of the engineer.

The goal of the project consists to understand the world that an IT risk department focused on the SAP auditory and consultancy. This includes the necessity of understanding the processes to carry out the project and having a close approach of the SAP world. Moreover, it is exposed the point of view of an engineer and the capacities and abilities that the person must have.

[1] SAP: Systeme Anwendungen und Produkte (Systems Applications and Products)

At the diagram that is shown below, we can see the duration and the activities realized over the project. Although it is accurate, it is important to understand that the team group's meetings were performed over all the duration of the work in order to be conscious of which part of the project we were done and be in the same page. In addition, with the clients we tried to keep them informed because of the nature of the project. Anyway, the most representative meetings and inflection points are marked in the diagram.



2. State of the art of the technology used or applied in this thesis

In this project it is used the SAP's software in order to perform IT advisory in any enterprise. It will be described, in a short way, how this technology can be exploited and how it is used by the advisors to substract the major information. At the beginning, it will be explained the technology itself and the licensing model that is necessary to perform both auditory and consultancy.

It is important to understand that the two topics explained below are divergent. But is mandatory to know about the software itself for being able to have a global idea of the licensing model and what is offering.

2.1. SAP's Technology

The SAP ERP system, or SAP ECC, is the collective term for SAP's functional and technical modules that enable enterprises to manage business processes through a unified system. ECC is the on-premises version of SAP, and it is usually implemented in medium and large-sized companies. For smaller companies, SAP offers its Business One ERP platform.

SAP ERP has different main modules, which are separated into functional modules and technical modules, each of which has submodules. Further, SAP also has industry-specific applications that support business processes unique to a particular industry.

The SAP software's world is enormous but in order to not make a long explanation this is, in a very short way, the basics to understand the SAP Software that allows to understand the next parts of the report.

2.2. SAP's Licenses

The SAP's licensing model is thought to facilitate the inclusion to any enterprise and to maximize its profitability.

To start is important to make the differentiation of Package Licenses and Named User Licenses:

2.2.1. Package licenses

Package licenses entitle to deploy and use the precise set of SAP software functionality that any enterprise needs to process and address its business requirements. The price of a package license is based on a key business metric that reflects its intended use.

SAP has developed these metrics in close collaboration with customers to align the metrics with a business's real-world requirements. Additionally, the licensed level of such metrics reflects the required capacity of the licensed software package, such as number of orders processed, number of contracts tracked, or gross written premiums.

2.2.2. Named User Licenses

A named user license authorizes an individual to access licensed SAP software functionality and is mandatory for most individuals accessing that functionality. A named

user is an employee of the organization, one of its affiliates, or one of its business partners who is authorized to access the licensed SAP software. The tasks and roles of the individual determine both the requirements and level of the named user license. Named user licenses are priced per user.

One major benefit of SAP's named user licenses is that they can be valid for multiple package licenses. How your employees work with an SAP solution will vary depending on their tasks and roles within your organization. To reflect this, SAP offers different categories of named user licenses. The most outstanding examples:

• "SAP Professional" named user license for users fulfilling operational-related roles supported by the software.

• "SAP Developer" named user license for users accessing the development tools to make modifications to the licensed software.

• "SAP Employee" named user license for users accessing self-services such as time, expenses, and performance evaluations.

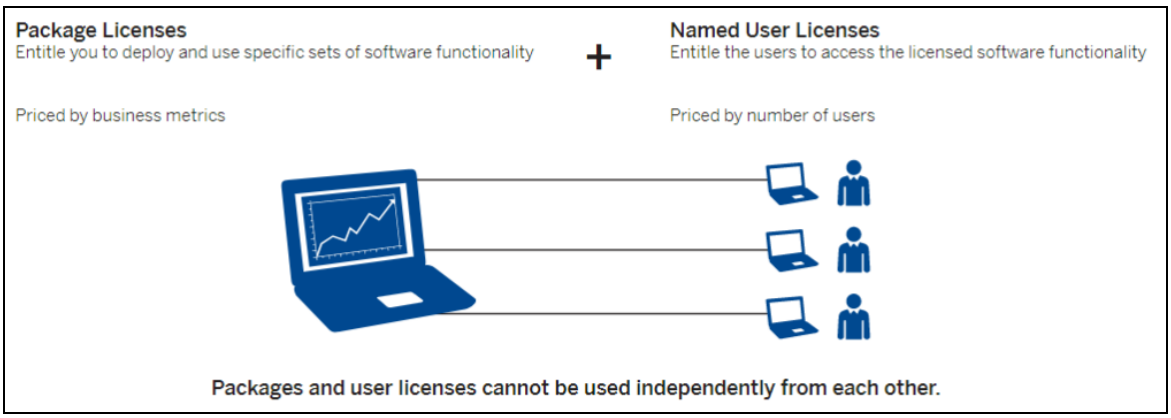


Figure 1: Functionality scheme of SAP licensing

Source: Licensing SAP Software [1]

Is important to keep in mind that depending on the needs of each company the licensing model can vary and for some concrete fields there exist some specialized licenses in order to fulfil the requirements.

Another aspect to take into account when we talk about licenses is the duration of them. SAP offers two types of software licenses: perpetual licenses and subscription-based licenses.

2.2.3. Perpetual Licenses

The clear majority of SAP software licenses are perpetual licenses. A perpetual license entitles you to use your licensed SAP software for an unlimited period. It is paid for the license when the software is licensed.

2.2.4. Subscription-Based Licenses

Some SAP products are available as cloud offerings with subscription-based pricing. Subscription-based licenses give you access to licensed SAP software that is hosted at a remote location and available to you based on your requirements.

It is capital to keep in mind that there are more kinds of licenses and kinds of licensing, but these are the most used and the ones that were used in the practical part of the project.

2.2.5. Priorities and organization

Each company is different, so it must be treated in a particular and specific way. It is important to highlight that in each system of the company and each sort of licenses may incur or not in this problem depending on how it was contracted.

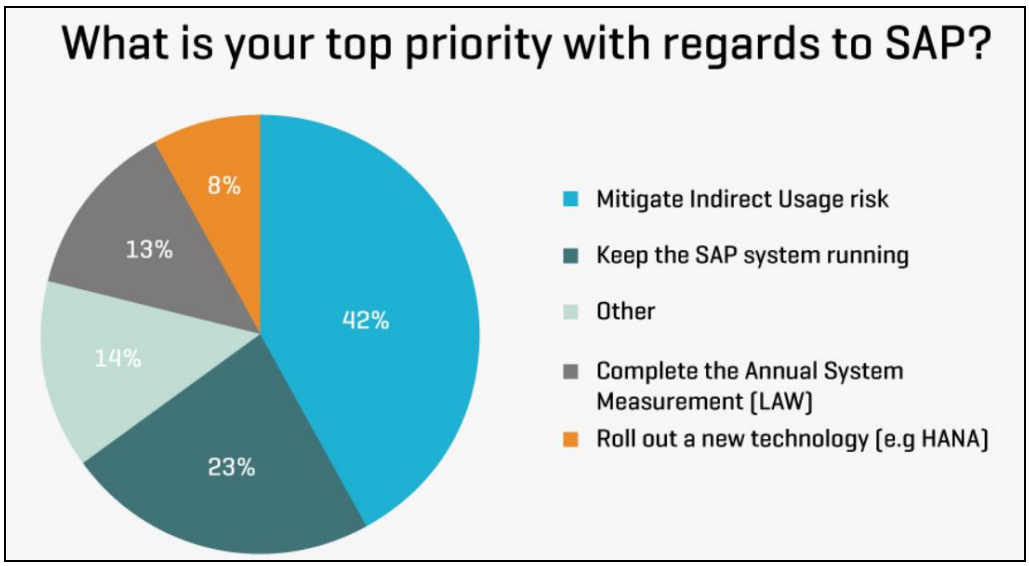


Figure 2: Priority Concerns

Source: Joachim Paulini's blog – SAP Indirect Usage [2]

In order to make a good job on this field we tried to follow the next sentence:

Joachim Paulini: "In some of the answers I have indicated that individual circumstances must be considered before making any conclusions about whether you are liable or not for licensing costs from Indirect Usage. My general advice to you is that you must have absolute clarity on the technical methods with which third-party systems connect to your SAP system(s). Amendments to terms and conditions, special terms, contract dates and many more factors determine your liability and these attributes must be taken into consideration [8]."

Another subject to take into account is the newness of the matter as it is possible to be visualized in the figure below.

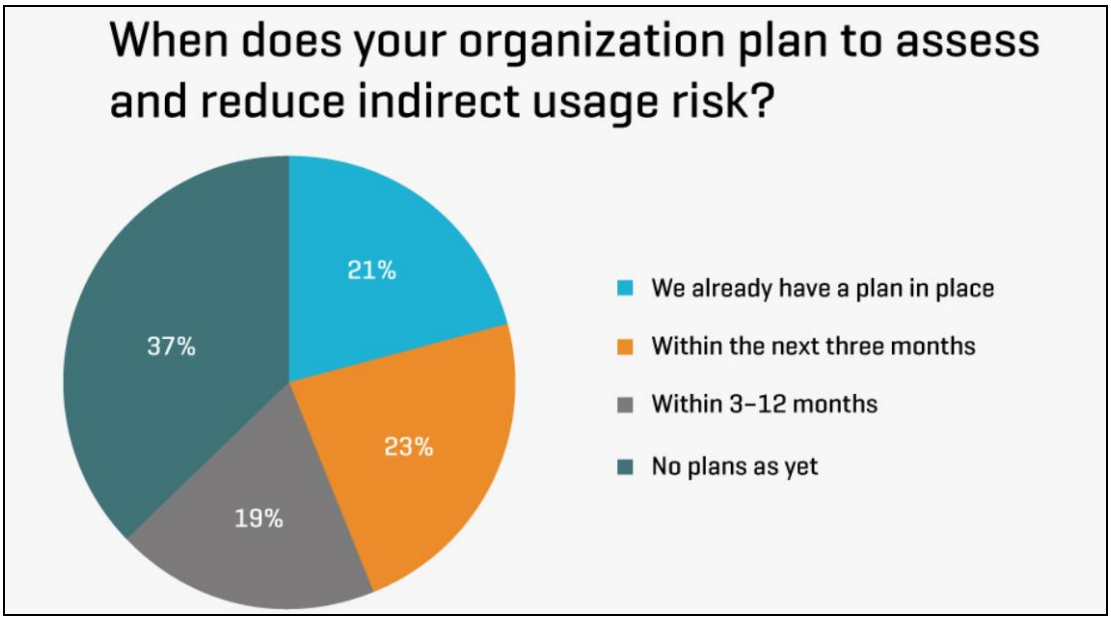


Figure 3: Plan to mitigate Indirect Usage

Source: Joachim Paulini's blog – SAP Indirect Usage [2]

In almost every company that it is needed to make an auditory, they do not have any plan to solve this problem yet. So, in every procedure this is one of the heaviest parts due to its complexity and the lack of references.

In almost every case, the solutions are based on mitigate the risks but is almost never plausible to create a safe environment.

3. Methodology / project development

ERP software is, by its very nature, critical for business processes. As a result, it has complex licensing and governance arrangements. Managing the use and licensing of ERP software is, therefore, a considerable challenge for teams not trained in this specific skillset.

In this first part it will be settled the basics of the problematic to understand how each step is attacked.

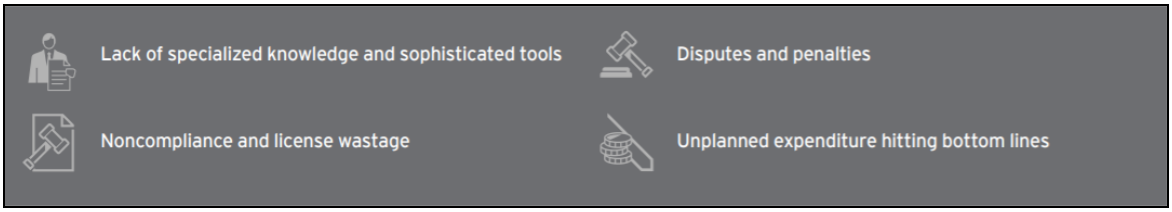


Figure 4: ERP Licensing Risk Factors

Source: Licensing Compliance Manager for SAP Software [3]

First, it will be described the checks that an auditory must accomplish. After this, it will be described the followed steps for the auditory and consultancy.

3.1. License Compliance Management

In this section is described the steps to take in mind that it helps companies to avoid financial exposure related to SAP licensing.

3.1.1. Compliance

This part is the first one and it is necessary to have a global idea of how is the state of the company. The compliance is based on track license usage against the license terms and conditions.

3.1.2. License Analytics

Once it is done the first part of the compliance, it is needed to follow two important points:

- Necessity of advanced analytics on the licensing data with a specific focus on addressing the complex licensing challenges and other issues such as indirect access[2] that could violate the contract
- Analytic results and insights into licensing issues of which organizations are unaware

3.1.3. Optimization

In this part, it is tried to take advantage and attempt to be more efficient by recommending and optimized licensing model. This part includes a hard study to understand the skeleton of the company.

[2] Indirect Access is the term used to define the situation in which an SAP customer is liable for purchasing additional licenses or paying fines for “using” the software without having first acquired the appropriate licenses. Typically, this happens when a customer fails to purchase licenses for users accessing the SAP software system indirectly via a third party or custom interface

3.1.4. Auto alerts

Is important to understand that with these sort of works the goal is to mitigate the risks because remove them is almost impossible. Being this way is essential to transfer the learnt knowledge of the company to the responsible, for example: To understand some important metrics such as overuse or underuse of licenses.

Now, that it is explained the problematic and the goals of any IT risk advisor project, it will be explained with detail, how they are done, and which is the methodology.

This part will be divided into Auditory and a Consultancy, and it will be ended with examples in order to comprehend in its totality the IT advisory's work.

3.2. Auditory

3.2.1. Benefits

It is important to understand, at first place, which are the benefits of the auditory and security of SAP:

- Reducing the fraud risks
- Guaranteeing the integrity, confidentiality and the availability of the business's data
- Reducing the risks of no-authorization access
- Fulfilling the law
- Controlling the productive and transactional fields
- Making stronger the intern control of the company
- Fulfilling the requirements of intern and extern auditory

3.2.2. Procedure

SAP Audit Management, the auditing process is divided into five phases: planning, preparation, execution, reporting, and follow-up. Different audit tasks are performed in different phases. The following graphic illustrates the workflow of an audit in SAP Audit Management. In order to understand the graphic it will be done a brief explanation to complement the graphic:

- Planning: The embryo of the project: workflows, milestones, program evaluation, critical path methods, inventory…
- Preparation: Basically, the kick off meeting and the preparation of the work program.
- Execution: The procedure of the project, working papers and work program.
- Reporting: Conclusions and results.
- Follow-up: The tracking of the changes and procedures of the project.

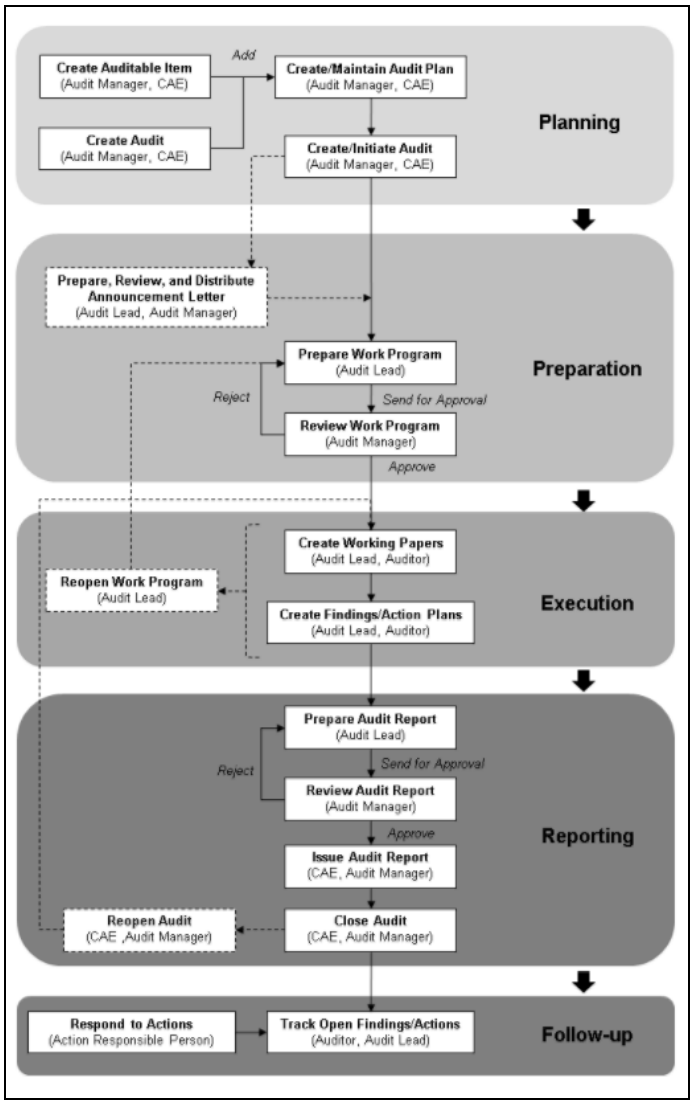


Figure 5: SAP Audit Management

Source: SAP Library – SAP Audit Management [4]

Is important to understand that the steps, as it can be seen in the picture, are not strictly one after another. Is possible that exists a restructuration of the project or new ideas come up, so it is important to be flexible and be capable of adaptation.

To focus on this, it is essential to see which are the steps that we have to follow to make the Preparation and Execution.

Access Control to programs and data

- SAP:
    - Configuration parameters of the passwords
    - Access to the critic's objects of SAP
    - Access of executing critic's transactions
    - Review of the security profiles
    - Review of the native profiles
    - Review the users and generic user's profiles
- Operative System and Database:
    - Access control to the operative system and database
    - Review the administrator's users and with security privileges
    - Review the connexion's users

Management of changes

- List the key users
- Monitor and restriction of the capability to unblock the productive environment and perform changes in a direct way (including in tables)
- Segregation of functions
- Users of programming in production

Informatic Operations

- Identify the levels of authorization
- Identify the activities for each business process
- Identify the controls automatics and manuals in each process
- Identify the function level and the ability level

Once it is defined the procedure and its particularities it must be considerate to know that this is only a basic review because every case is different, and it will be needed to include or remove some steps.

In any case, these are the steps that we have put in our work in order to track every step of the auditory. Moreover, lots of systems share various kinds of software that add a difficulty when it is tried to do an auditory.

3.2.3. Indirect Usage

It is needed a special mention to Indirect Usage because the described procedures are no exactly the same in order to take it under control.

As it is explained before, indirect usage is any plausible situation that the licenses are not used in the strict way defined in the contract. This cheat concept in some cases is pretty transparent but in some others, is very tricky and really difficult to understand.

Here are a few situations where the risks of Indirect Access are high:

- Web-Based Storefront: A handheld iOS or Android device used to track goods movement and transfer postings which are updated into SAP in real-time
- Handheld / IoT Devices: Handheld mobile devices, or IoT devices like Google home or Alexa that can be used to automate the task of updating data into SAP in real-time. For example, using a mobile device to track goods movement and transfer postings, or a sales representative using a handheld device to place orders for customers.
- Customer Relationship Management Applications: Third party CRM applications which access SAP to provide information to their users. For example, a supplier remotely checking stock level for raw material, and automatically sending shipments when stock level is low.

Once it is explained where that risk can be performed we needed to create some steps to, at least in some way, perceive where it can be risky.

When an application exchanges information to and from SAP using some common communication medium, it is said to be “interfaced” with SAP. To identify Indirect Access risks, it is important to inspect every application that interfaces with SAP and assess whether the business process requires an unlicensed user to “Use” the SAP software system.

- Understand the Contract

  Start by checking the definitions of “Use” and “Named Users” within your contract. Make sure to understand all the implications of the language as it pertains to your own business scenarios.

- Review Your Application Architecture

  Map all the applications within your Architecture. To do this properly, you must understand the flow of data between the interfacing applications and SAP. You will need to know if data is only being pulled from SAP (read only) or whether updates to SAP are being made as well. Creating a technical architecture diagram can better help you visualize the interfaces.

- Understand the Business Process

  Get a clear understanding of the purpose of implementing each application in the architecture, and its related business processes. The more critical a

business process is to the daily operations of the organization, the more likely it is to be scrutinized. SAP is also likely to pursue customers with a new business process that directs revenue away from SAP and towards third party vendors.

- Be Cautious with Interfaces

  Interfaces that have a real-time information exchange have a higher potential for Indirect Access, but the level of risk depends on the type of data being exchanged. For example, interfaces which require a fairly quick response after sending a request have a higher level of risk than periodically timed batch processes or file transfers.

Typically, RFC connections (used for the real-time information transfer) and iDocs (used for exchanging documents) have a higher risk of Indirect Access. However, the frequency or method of data exchange does not matter as much as the underlying business process supported by the interface. A lot of information needs to be provided to the auditors in order to make a good job on this part because there is nothing that finds everything on the systems about de indirect usage.

Identifying Indirect Access risks is challenging for both SAP and its customers due to licensing complexities and the customer's business processes and customizations.

Aa it can be understood the concerns about Indirect Usage is very remarkable and is the major priority of the customers. As it is explained before and it is needed to be underlined here this risk is not possible, in some cases, to be easily mitigate it because this would suppose a perfect understanding for everyone that is using it. Besides this, depending on the contract that the company has regarding SAP some actions may be risky or not.

3.3. Consultancy

Being aware that this project contains both Auditory and Consultancy, lot of the work that we have done in the first part will be used in this one. Basically, the consultancy is about advisory on how the SAP software can be improved to maximize the efficiency of the workers.

Following the structure of before, to start, it is needed to understand the proposed services for the consultant:

- Strategic interpretation and solution architecture

  The methodology of converting strategic business goals into a set of IT deliverables. We work with the business sponsors and the Information Systems team to agree the desired IT architecture.

- Application design and business process requirements mapping

  Focused consultants carry out the definition of business requirements and the blueprint of how these requirements will be captured in SAP.

- Design and configure application processes

  Building the SAP solution from business process requirements.

- Design and build RICE reports, interfaces and conversions

Customisation services that cover inbound and outbound external interfaces, data loads and online report formats.

- Prototyping or pilot

  Review and assess the impact of a solution without committing to a full implementation.

- Business solution integration testing and support

  Based on an understanding of both the business and SAP

- Scheduling, workflow and security authorisations

  Services tailoring SAP workflows that go across several business functions (e.g. procure to pay) and the creation and definition of SAP roles and IDs to ensure industry compliance standards

It is important to underline than the consultant's work is much related with what the enterprise wants and the cooperative level of them. In other words, the level of improvement and the limit of the consultant's work entirely depend on the customer. It is always plausible to improve any business system so although the consultant could explore news ways to enhance the system, it is always limited by the company.

Once it is explained the services that a company could require, it will be described an approach in order to understand how the goals are performed:

- Governance and delivery project management

  Supporting the delivery of any size of SAP implementation to discrete work packages delivering focused business change.

- Full lifecycle change management

  Supporting business change working alongside the technical delivery.

- Knowledge transfer

  Education services for the new SAP implementation including training and collateral.

- Data migration

  Covers the extraction, cleaning, data transformation, data loading into SAP and archiving of data from both SAP and the legacy systems.

- Transition services

  Managing the movement of the system into a live environment, including the business transition from legacy systems to SAP.

- Post go-live support services

  A range of support services when the system goes live and before carrying out a structured handover to your internal SAP support team.

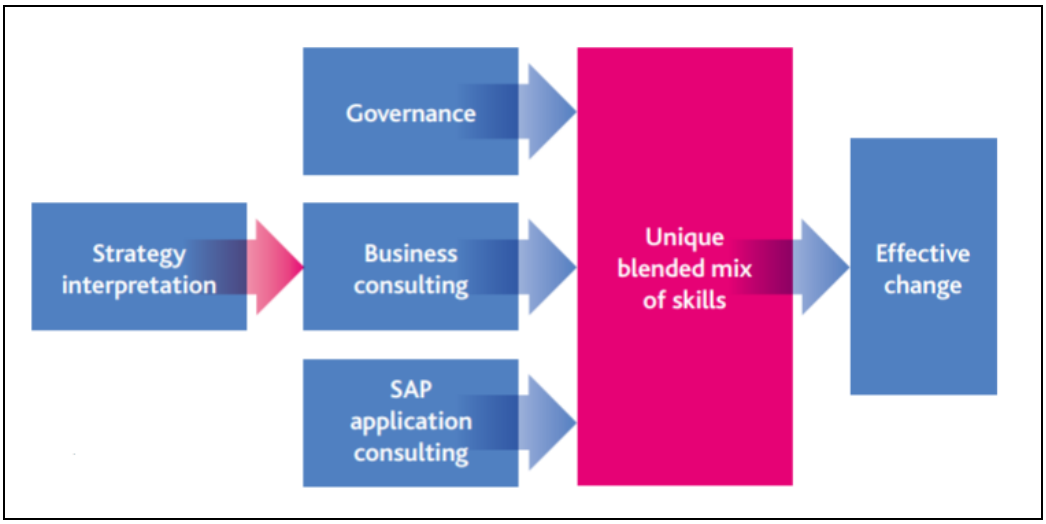


Figure 6: Approach

Source: Capita - Consultancy Services [5]

Now, it is explained not only the goals but the approach, but is essential to focus on how it is processed in order to have the best global vision of the consultancy possible. It is raised that the consultancy, unlike auditory, contains a part that does not depends on a checklist but in how the particular consultant see the problem and how glimpse the solution.

Although it is necessary to create some steps in order to make it more structural it will always depend on how the consultant faces the problematic raised by the customers.

The process will start with understanding the problematics of the client and which parts of the software are needed to be changed:

- Process Changes

  Anything that can be improved due to enhance any SAP's process in the customer's company or taking advantage of any chance in the structure.

- Function Changes

  Any change in the functions of any person or any systems are needed to be studied.

- Infrastructure Changes

  Review any infrastructure change in the company in order to adapt to the new SAP system

It is needed to be remarked that SAP's software can be adapted to the company, so it is important to review these three points in order to make an efficiency work.

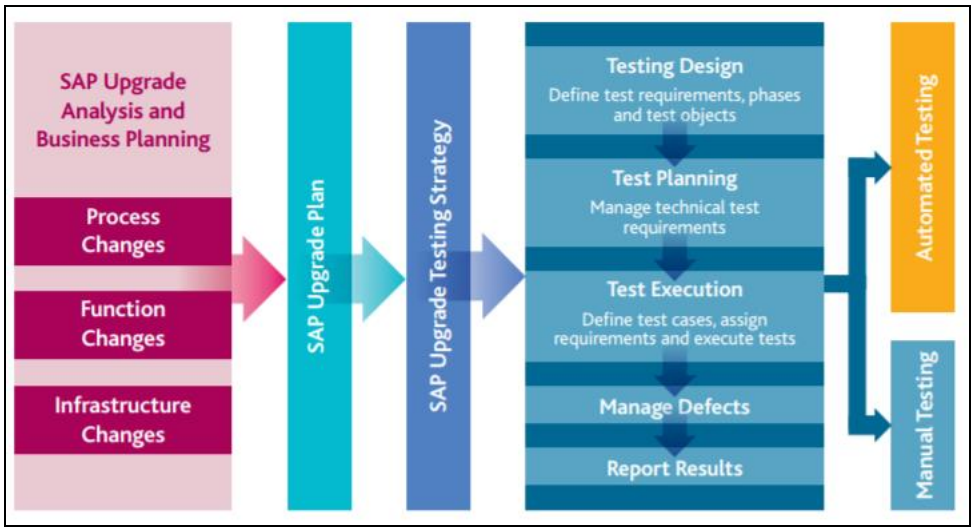


Figure 7: Process

Source: Capita - Consultancy Services [5]

4. Practical Examples

In this section the practical part of the project will be introduced. It contains a real case of an auditory and how it was performed and a second part that includes two different real cases of a consultancy and how they were thought and done.

4.1. Audit

In the first example, it is explored a practical of an auditory. As it is explained, the followed steps to perform it were the ones that are described in the methodology.

Before starting with the example, it is important to remark that if the relevant company has SAP software it can be audited at any time by SAP. The auditory can be performed in two ways.

- SAP sends a worker of his company to perform it.
- SAP asks for some tables[3] that are integrated in the SAP software where appears the relevant information that is required.

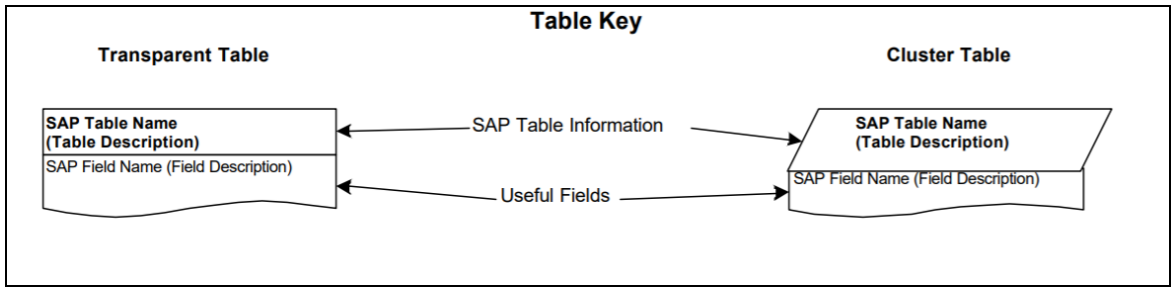


Figure 8: Table functionality

Source: SAP Table Relations, version 1.0.0 [6]

The SAP tables are the source of structured information of the enterprise. SAP uses a kind of database related with the tables that contains one or more key fields. SAP contains standard tables of which feeds and inform of the transactions of the systems. It is capital, when it is used SAP, to know the most important or the ones that can be needed in the project. Notice that there exist a lot of tables and some of them are related between them, so it is complex. The difficulty born to understand what are and what are not the essentials for the project.

More explanation is given in the appendix, but the corollary is that they provide the information of the users and engines of the systems in order to be audited.

In this case the company only wanted to audit the users. So, the default steps created needed to be changed to fulfil with the goal.

[3] The SAP's tables are basically all the information required for an auditory that is captured by the system itself.

In order to audit the company in question, ii was asked the information on the tables:

Tx	Tabla SAP		GRD	GRP	SCD	SCP	SLM	SLD	SLT	BID	BIP	G03		Descripción
	AGR_1251		x	x	x	x	x	x	x	x	x	x		Connection information - indirect access
	AGR_1252		x	x	x	x	x	x	x	x	x	x		Authorization data for the activity group
	AGR_AGRS		x	x	x	x	x	x	x	x	x	x		Organizational elements for authorizations
	AGR_DEFINE		x	x	x	x	x	x	x	x	x	x		Roles in Composite Roles
	AGR_PROF		x	x	x	x	x	x	x	x	x	x		Role definition
	AGR_TCODES		x	x	x	x	x	x	x	x	x	x		Profile name for role
	AGR_TEXTS		x	x	x	x	x	x	x	x	x	x		Assignment of roles to Tcodes
	AGR_USERS		x	x	x	x	x	x	x	x	x	x		File Structure for Hierarchical Menu - Customer
	DEVACCESS		x	x	x	x	x	x	x	x	x	x		Assignment of roles to users
SM59	RFCDES		x	x	x	x	x	x	x	x	x	x		Users with develop keys
ST03N	ST03N													Connection information - indirect access
	T000		x	x	x	x	x	x	x	x	x	x		Client Settings
	TSTC		x	x	x	x	x	x	x	x	x	x		SAP Transaction Codes
	TSTCT		x	x	x	x	x	x	x	x	x	x		Transaction Code Texts
	USR02		x	x	x	x	x	x	x	x	x	x		Logon data
	USR06		x	x	x	x	x	0	0	x	x	x		Additional Data per User
	USR41_MLD		x	x	x	x	x	x	x	x	x	x		User Multiple Login Data
	UST04		x	x	x	x	x	x	x	x	x	x		User masters
	UST10C		x	x	x	x	x	x	x	x	x	x		User master: Composite profiles
	UST10S		x	x	x	x	x	x	x	x	x	x		User master: Single profiles
	UST12		x	x	x	x	x	x	x	x	x	x		User master: Authorizations
	V_USERNAME		x	x	x	x	x	x	x	x	x	x		View for Reading User Name (Combination of ADRP & USR21)

Figure 9: Tables required

Each table contains parameters that the company needs to be audited. It is important to underline that there are not all the tables.

In this case, as we were focusing on the users, it was needed to be very precise to control how many users and which kind of users they had in every system. In this example we have followed two ways:

- Track each contract and each change of licensing that the company have done. With this work we had the number of user's licenses and packages that they had.
- Mix the tables and decode them in order to be capable to understand.

At the end, we needed to make a comparison between the two results and report them to the company.

Basically, the auditory is the assurance that everything is correct and the company's compliance with the law. The second part of the auditory was about indirect usage. As it is explained before the basic steps to audit are no enough, so it is needed an extra work in order to minimize the possible problems that may appear in the auditory.

Being this way, the figure below explains which kind of results is expected from us to report to the company.

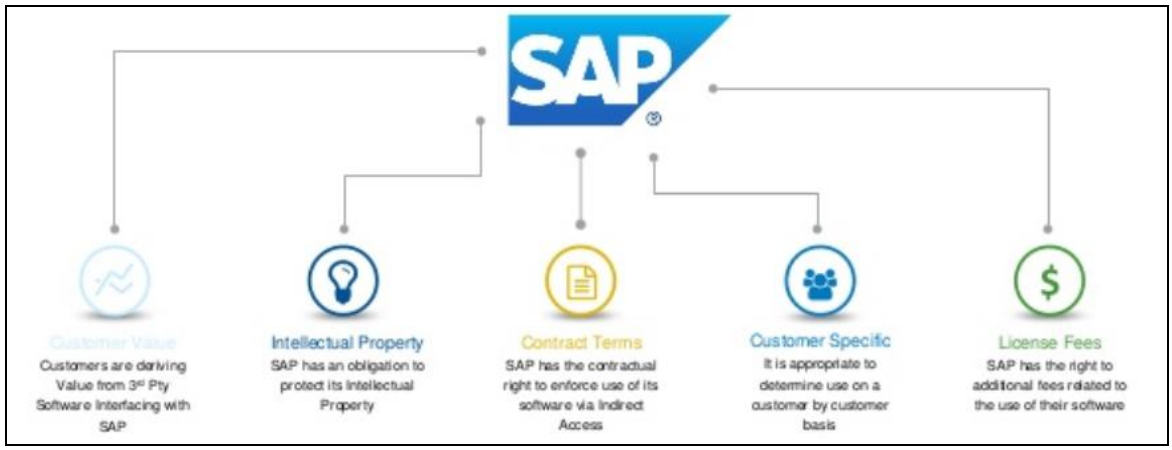


Figure 10: Indirect Use Justified Through Business and Contractual Rationale

Source: Take Proactive Control of your SAP licensing, Indirect Usage and Vendor Management [7]

In order to perform the control of this risk we had to do:

- Review the Contract

  We went through the contract looking for any language that enables you to complement your architecture. In this case, the Indirect Access risk was not discussed during the contract negotiations. But from this audit and anything that it is going to be acquired it was underlined to make a negotiation to mitigate this risk.

- Negotiate a Solution

  It was necessary to reach out to SAP to uncertainties and try to negotiate an extended contract that covers the needs of the company. Here are some ways in which we did some mitigations resolve Indirect Access situations.

  - Add specific and detailed language to the contract that explains how SAP software will interact with other applications, then negotiate to have such use cases excluded from having any Indirect Access liability.
  - Negotiate a special low-cost license type for external users performing minimalistic activities in SAP.
  - Consider replacing the named user license model entirely to a revenue or volume based model.
  - Include clauses in your individual license agreements that give you leverage to use your own data from the SAP system more freely, even though the SAP software processed it.

4.2. Consult

In this part, it will be exposed two examples of consultancy. On the contrary of what is done before, in this case is required to improve the system of the company. As it is explained before, this part has not a checklist, so it depends on what the client demands and what consultant believes is the best option.

Is important to stand out that a consultancy is not a legal requirement itself, so the relevant company have much more interest to share and participate on the project because it is done in order to improve the management of the company. Besides, for the consultant itis more stimulating.

It will be described with two examples, in the first one it will be tried to perform a reliable and integrated infrastructure. In the second one, it will be commented and example of mobility enterprise.

4.2.1. Reliable and Integrated Structure

The relevant company in this case, is relying on a patchwork of legacy solutions due to several acquisitions. Underline that many companies, even more the bigger ones, have several problems to control the problematic of the number of licenses that they get.

To support growth and harmonize business processes enterprise wide, the company decided to replace its legacy software with the integrated SAP ERP application. Is important to underline that is almost impossible to change at once all the system. In this case, and on the majority, the clue is to change systematically the software starting with the biggest parts due to its facilities to be replaced.

The software functionality was licensed through the “Enterprise Foundation[4]” package. This is offered for a predetermined price that is not based on business metrics. Additional functionality for specialized tasks is provided through “Enterprise Extension” packages, with prices based on business metrics. Depending on the case and the company the metrics will be discussed with SAP in order to reach an agreement.

In addition to its package licenses, the company needs named user licenses. These are available in different categories that reflect specific user roles. For this work, we needed to comprehend what every worker’s job had and how we could make an efficient work and, if it is possible, making easier his job.

As it can be predicted by the introduction, the uncontrolled way to manage the licenses turned into a real problem. As it is seen in the figure below, this is a classic example of what happens in almost every company that has not a good track of its employees. To be able to assign different roles, exclusive action in consultancy, it is essential to be able to know not only the functions of the company but also what each user is performing in order to restructure the license scheme.

It must be remarked that the assignation of the license is a complex issue. In order to make a good approach it is needed to be asked if the licenses should be assigned based

[4] The “Enterprise Foundation” package delivers powerful functionality that supports processes in key areas including: Financial management, Human capital management, Procurement and logistics

on authorizations or current use. According to SAP we need to follow its System Measurement Guide[5]:

"To be able to measure all users of your SAP installation clearly and exactly, you must classify your users in accordance with the current use and the underlying price list before every system measurement."

It is not only about the connexion between the hierarchy pyramid but about the accordance with the current use. Being this way, the consultant must know which the role of every employee are.

License Type	License Description	Purchased Licenses	Recommended
CB	SAP Application Professional	600	350
CC	SAP Application Limited Professional	150	300
CD	SAP Application Employee	550	100
CE	SAP ESS Application ESS User	100	100
CF	SAP Application Business Expert	15	0
CG	SAP Application Business Information User	100	50
	Total	1515	900

Figure 11: Purchased and recommended licenses

As it can be seen the number of licenses that, at the end, are needed is very different. In addition, the number of recommended licenses of almost every type is changed. It is almost essential to be consulted over the years because, all above in the big companies, the facility of underuse or overuse the licenses is plausible.

A part from this job, we had to found out a way how the company could perform and visualize reports. Therefore, we needed to add an extra tool of data analysis. In this case, we used the Business Objects solutions designed exclusively for that purpose.

With this flexible and scalable platform, the users have a simple access to information ready to be manipulated. It promotes a better way to take the decisions being an intuitive and transparent application.

It is important to underline that this integrates licensing scenario because we needed that the data flowed between the SAP ERP and this business intelligence solution.

A part of the platform, it was needed to assign some user's licenses in order to provide the benefits. In this case, we needed to view and coordinate with the client how many users should have this and which were the permissions to view, change or remove the information.

As it is seen in this clarify example the package and the options available are several and the consultant must know and must be in continuously learning to provide the best solution.

[5] Source: https://help.sap.com/doc/erp_hcm_ias_2013_02/1.0.4/en-US/48/c6ed117a004da5e10000000a421937/frameset.htm

4.2.2. Mobility Case

In this consultancy part, we needed to provide the required mobility to the company.

It is needed in many cases to find innovative ways of increasing business productivity through the adoption of new technology. Mobile and in-memory technologies have been determined as the best way to grow.

On the contrary, now we were looking for an enhancement of the system in order to be more efficient and get the best performance. It was required to go wireless and the possibility of having a mobile app. To solve this problem, we needed to create a Secure Mobile platform. Being this way, we needed to find the correct application and coordinate with the client its necessaries users to maximize the exploitation of the app.

We coordinated with the users that the best application that suits better was the SAP Travel Receipt Capture mobile app. With this, it was possible to reduce the administrative overhead of saving, sorting, and scanning expense receipts after a business trip, and reduce the chance of lost inaccurate paper receipt by creating electronic expense items anywhere and anytime.

As it is explained before, it was also needed a secure mobile platform. The company contracted the “SAP mobile Package”. Whit is it was possible to:

- Easily exchange data between traditional back-end systems and multiple mobile devices
- Create enterprise-grade apps for mobile devices, wearables, and desktops on a single development platform
- Give employees access to essential enterprise applications on corporate or personal devices

As before, we needed to assign the right users. We needed to talk with the different departments and managers in order to fulfil the specific requirements.

At last, and to complete all the needed migration, we needed to export it to the CRM system that was the same work. To help ensure that this functionality is licensed correctly and protected for security, it is also licensed:

• SAP Mobile Sales application to allow the SAP CRM Sales mobile app to access business data

• “SAP Sales” package

• The appropriate SAP named users

As it is seen, we needed no to only to licenses the same package but to add the SAP Sales package in order to be able to work on the CRM system.

In the image below, it can be seen a summarizing of what includes and the benefits of the SAP mobile Platform for both systems.

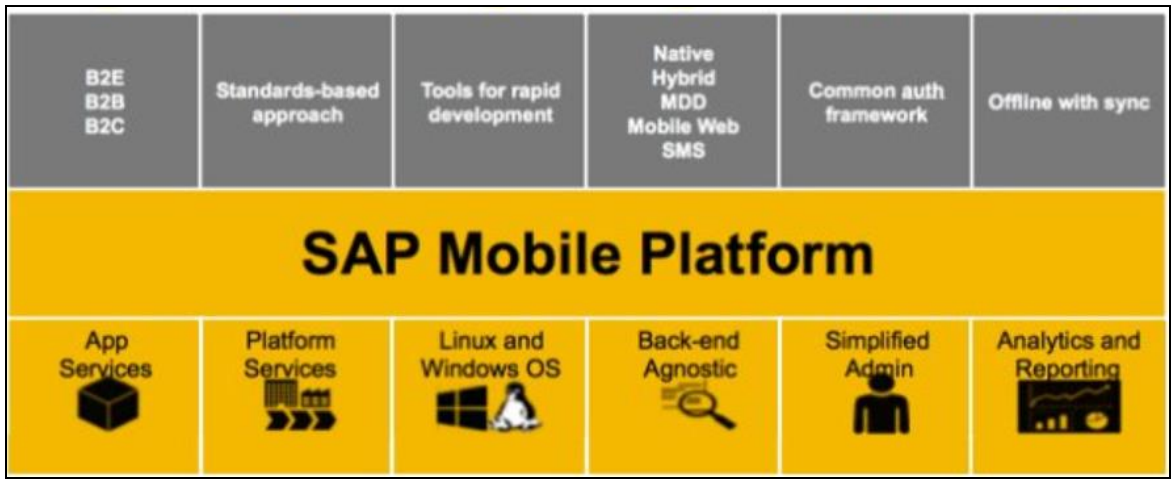


Figure 12: Mobile Platform

Source: www.sap.com [8]

4.3. Results obtained

In this project, it is needed to distinguish the two involved parts: The Auditory and the Consultancy of the client.

The auditory part must be taking it with awareness. The procedure is based in a kind of checklist that will obviously, although not a lot, vary depending on the company but it can be basically done with the correct steps and keeping in mind the meticulousness of the work.

In the client's company the results were, at the first instance, very shocking, all above in the indirect usage. In the case at hand, the differentiation between the purchased licenses and the ones that we have obtained were important. As it is explained before, the difficulty to have a correct maintaining of the licensing scheme is complex due to it is facility to fall into using more than what it is contracted or, in the contrary, having a super habit of licenses. In the case that is treated, they fall in the first case, so it was needed to be reported in a quickly way to allow them to buy the ones that are required.

Regarding the indirect usage it was needed much more effort and constancy. We needed to know the skeleton of the enterprise and the work of every worker of the company in order to make a good job. In this case, the value of the engineer was essential. This job was a good coordination between the supervisors of each department and us so it is obvious that a good and a transparent relation between the two enterprises is required. This job needed a good exposition and understanding of the work of each worker and the difficulty of the new roles assignation with the blessing of each manager. Once this was done we needed to escalate in the pyramid of workers, in order to go from the base to the top, to perform the same actions.

In this case the engineer's work was very valuable because it was needed many previous concepts to be capable of perform the goals that we had in mind. Some characteristics of every engineer were captured in this work. We needed some methodology and the capability of create it not only by oneself but also in a team. The adaptability and the necessity of the proactivity were one of the main characterises that the team needed. In this environment, it was required technological concepts and abilities in order to understand and identify the conditions to make the best possible project with the given tools.

Besides this, and one of the things that we needed to share was some capabilities of learning and innovation because, as it is said at the beginning of the project, this was something new and we did not have any created methodology or some checklist to follow. Being this way, we needed a critical and analytics mind that allows us to solve the purposed problems with efficiency.

It is also capital to underline the importance of the teamwork. One of the difficulties of the job was sharing the knowledges and agrees with every step that we made. The teamwork in this field was important, all above, when we were developing a way to follow. Moreover, we did many meetings with the client in order to be in the same page, for not only describing them in which point the work was but also to explain them that were the next steps because we needed his completely blessing and cooperation.

The Consultancy work was more difficult, but it has to be said that with the past work we had many of the jobs done.

About consultancy, the starting of it was one of the most complex things. We needed to understand and glimpse what were the needs of the clients: The complexity and the real possibility of them keeping in mind the time that we had and the hours that we had to finish the project. Underline that, in this case, the job requires more creativity and a good exposition in order to explain the possible solution that we are able to offer in all the problematic that we faced.

In the first case of consultancy the importance was about assure the reliability and the integrity of the structure. In this case, the difficulty born on the real understanding till which point the client wanted these characteristics. In that moment, we tried to make different solutions depending on what we though the client would agree. The teamwork, in this case gains importance, each component of the group searched for different solutions and tried to put in common in order provide the best possible solution.

Besides the difficulty of looking the best option we needed to understand the enterprise in order to save money about the user's licenses. This works requires a big effort to understand if each employee was completely taking advantage of his license. In this case, it was also important to cooperate very close with the enterprise. It was easier than with the audit because we were not restructuring anything in order to avoid risks but to propose a new way to assign it. As it is explained before, always keeping in mind the use that the worker would done not the level of authorization or the position in the chain of command in the company, of the person in question. Another way to maintain integrity was assuring that each employee had only the necessary rights to have not the permission of viewing the information or the possibility of manipulating it.

At the end, they were two separate works that are meant to be together. Assure the integrity of the system by buying new packages that allowed our goals and a recommendation of what we thought it is needed about the user's licenses allowing the system to be more secure.

In the second, consultancy work it was needed an important job of gathering around the information of a new kind of necessity. The relevant company needed to enhance its systems and required the necessity of being able of work in different platforms.

In this work, although the complexity seemed very high the SAP's software has different solutions to fulfil the needs of the clients knowing that the market is changing and the possibility of applications and the facility of being connected at anywhere are essential.

In this case, the difficulty lies down in understanding the possibility and the exact requirement of the customer in order to have a global vision of the project. It is worth to noting that the major concerns of the clients were solved with the basic default applications of the SAP's software.

Here, more than any other project, the work was really close till the point that we went to work to the client's office itself. It is important to understand that an application of this characteristics and its price has many changes and a lot of people in the client's offices wanted some special things or authorizations to make their lives easier. Therefore, the work was about having meetings with different parts of the client's office and, at last, tried to mixing all this needs and requirement to make the best possible solution.

In the part of consultancy's work, the engineer value is more important than in the other part. Here, is not only needed the capacity of create a methodology, it must have a strong analytic aptitude in order to synthesise the needs of the client and the necessity of taking attention to every detail of the project and the exposition of it.

5. Budget

The budget of this project includes the full-time work of three people during almost two months and a half. The auditory and the consultancies were sold it for 30.000 euros.

The structure of the people that formed the group was:

- Manager: Telecommunication Engineer
- Senior: Informatic Engineer
- Assistant: Telecommunication Graduated

Depending on the category each hour's values is different.

Besides this, we needed some special software and scripts in order to be capable to perform all the client's necessities that the company itself facilitated to us.

6. Conclusions and future development

In this project I have learned the importance of having or developing some important characteristics both individual and group to be able to perform any IT risk project.

The fact that the project has been performed in a real company allows understanding not only the procedure itself but to comprehend how a company and the workers do their jobs and how they interact with a company that audit and consult them. This gives a plus of learning because allows the engineer not only to work in a technical field but to be able to communicate and express the problems and the solutions as well.

It is important to make a differentiation between the consultancy and the auditory and the needs of each one. On one hand, the auditory is performed because it is legally required; the company has the necessity of corroborating that its bills and numbers are correct. The fact, because of its nature, is not easy to work with the audited company and this complicates a lot the work.

On the other hand, the consultancy is required for the company in question in order to enhance its processes and be more efficient. This kind of project is very useful for the company and if it is well-performed it helps a lot to make the department more effective. As the involved company is willing to be better the cooperation is total and it makes easier to work.

In the individual point of view, it is needed to be remarked the importance of three abilities that, in my opinion and particularly developed over the career, are crucial to carry out a project of these characteristics. First ability, criterion, it is especially important to be able to make good judgements and having the capacity of resolving some aspects with determination. This would be a good ability not only for every step of the project but to allow oneself to have a global vision in order to see and analyse the situation and decide which is the best way to take. Besides, when some eventuality occurred, this ability allows adapting the complications easier way.

A second ability that it is needed is the capacity of self-learning. It is not only about to fulfil the goals with the imposed orders but to be able to be proactive, think and expose new and interesting ideas that, at the end, can facilitate the project. In addition, it is capital to understand that some faced problems do not have an easy solution or one that can be just asked, therefore the capacity of looking for information for oneself and resolve the problems is a wished skill. It has to be remarked that this competence only can appear in a breeding ground of technological study. Being this way, only with the adequate background of studies this can be achieved.

The third ability, for me, to be remarked is the creativity. It is, may be, the less analytic quality but, without any doubt, one of the most important when it comes about IT project. For any advisor it is not only needed the ability of being capable to reproduce with perfection what it has been taught but to create something new. With this, is easier to find new ways and to take advantage from any possible resource.

Obviously, the number of characteristics that an engineer needs is enormous but, for me and regarding this project, these may be the most important.

As this project was made in a group it is required to explain the importance of having some abilities to be able to participate in one. Participating in a work group has its benefits and its perks but it is obvious that with a group is easier to arrive further. In this project I have learned and ratified some skills that are required in order to perform a good work.

For me the most important is a good leadership, a glue that holds the team together, offers encouragement and motivation and is capable of express the needs of the project. It is capital the organization and the delegation of the tasks being aware on what the team members are better at in order to speed up the project.

Another ability of the group must be the integrity and the communication. It is essential to have a good communication among the members of the team in an openly way. Sharing the thoughts, opinions and ideas and taking into consideration what others have to say foments an efficient way to perform the assigned tasks. Being this way, it is easier to be more helpful and have a clarified way to see what is being done and not losing oneself in the amount of work.

The last quality of a successful team, that I believe is important, and is very related with the other two, is the introduction of a bit “fun” in the work group. If not, the project can lead to burnout and lack of productivity, so it is important to inject a bit of enjoyment into working life. For me the teams that work particularly well together are related with a good relationship. A strong team that joys a good, healthy and respectful relationship among the members will be traduced in a good work.

To sum up, in order to perform, in a good manner, an IT project is indispensable to have some capacities that an engineer should have to improve and develop over his career not only to be able to do the project but to lead a team. It is important to pay attention to the people from who it can be learnt and to be grateful for the technological background and the possibilities that offer.

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Appendices

“SAP Table Relations version 1.0.0 compiled by Christopher Solomon with contributions by various SAP Professionals”